

III. Program Summary Narrative

Introduction

Assistant Advisor II seeking merit increase to Assistant Advisor III, my FTE are as follows:

County	Yearly FTE	Program Area	Condition Change	Yearly FTE
Imperial	75%			
Riverside	15%			
San Bernardino	10%			
		Meat Production and Food Safety	Improved Food Safety	20%
			Improved animal management, productivity, and efficiency	40%
			Increased preparedness and resilience to extreme weather and climate change	40%

Livestock is the number one commodity in Imperial County, number three commodity in Riverside County, and number two commodity in San Bernardino county. The combined value of livestock in all three counties is approximately \$830 million. Most of the value comes from Holstein steers, a byproduct of California’s dairy industry, and heifers. Most feedlot cattle in California are in the desert area. Productivity of these animals, ultimately affecting the economics of animal production in the desert, is crucial to maintaining the livestock sector in Imperial, Riverside, and San Bernardino counties. In the winter, the Imperial Valley and Yuma growing regions produce 90% of the leafy vegetables consumed in the US with a value of \$984 million. Livestock are often raised near fields of fresh produce. There is a need for food safety research addressing the interaction between the two commodities, especially indicated by the multiple E. coli outbreaks on Romaine lettuce, one of which originating in Yuma, AZ. Based on the needs of my clientele, my thematic program areas are the productivity, efficiency, and sustainability of animal agriculture, as well as food safety and environmental quality. The research and extension will contribute to the improved food safety of the California and US food system, improve animal production, and increase preparedness and resilience to extreme weather and climate change.

Theme #1: Productivity, efficiency, and sustainability of animal agriculture

Cattle Needs Assessment

I initially focused on identifying the needs of the area to better aim my program activities to be effective. I reached out to feedlot, heifer lot, dairy, and calf-ranch operators as well as leaders in the California Cattlemen’s Association, UCCE beef related specialists and advisors, non-livestock commodity groups, government agencies, and county leaders. This included group conversations, commodity meetings, surveys, and individual contacts.

Outcomes and impacts: I identified the most pressing needs for the cattle industry in the desert region of California: heat stress management, identification of alternative feed ingredients to decrease cost of feed, improving identification of sick cattle, managing labor shortages, and pathogen interactions with nearby fresh produce field (covered in theme #2). Outreach was effective in making myself and UCANR known and recognizable to the local cattle community. 100% of the feedlot managers in Imperial county now recognize the UCCE Imperial County

Livestock program as a resource for questions, concerns, and outreach regarding cattle management. Previously, many managers had only a vague understanding of the role of UCCE due to the gap in time between the previous livestock advisor and the onset of the current program in 2017. Long term, the needs assessment efforts will shape the livestock program to provide research and extension activities that will improve the productivity and economic success of the cattle industry in the desert area of California. I plan to continue regular assessments to maintain an understanding of the changing needs of my clientele.

Feedlot Nutrition and Management

Monthly feedlot newsletter: Feedlot operators expressed a desire to read about the research conducted by UCANR and the UC system in a concise one-page overview. Results from program research plus research done previously by Dr. Richard Zinn (UC Davis) have been outlined in 13 monthly newsletters.

Outcomes and impacts: The monthly newsletter has a readership of 100% of the feedlot and heifer lot operators in Imperial County, the feedlot nutritionist serving all feedlots in the Imperial Valley, and the veterinarian serving 75% of feedlot cattle in Imperial County. Conversations with feedlot operators following monthly publications indicate that several plan to implement one or more management technique from the newsletter into their practice, including utilization of feed additives and altering hormone implant management.

Calcium and Amino Acid Supplementation: Research aimed at determining amino acid and calcium requirements for calf-fed Holstein steers during the early feeding phase when rapid growth occurs. Targeted management changes that would improve animal productivity and improved economic impact through decreased feed cost. One peer reviewed article and three-monthly newsletter articles have been published on this information, with other peer reviewed and monthly newsletters anticipated.

Outcomes and impacts: Studies identified lysine and methionine supplementation rates to improve average daily gain and feed efficiency of cattle by 8% during the initial feeding phase and that calcium deficiencies seem to be secondary to other nutrient deficiencies, so current recommendations are adequate. It is expected that the feedlot nutritionist will adopt this information to better balance cattle diets for all feedlots supplementing amino acids in the diet, ultimately receiving economic benefits from improved animal performance.

Virginiamycin supplementation: Modifications in antimicrobial use allowances have changed management for liver abscesses in calf-fed Holstein cattle, who are especially prone to incidence of liver abscess. Our study assessed zero versus the maximum allowable Virginiamycin feed concentration to identify production improvements and liver abscess incidence in calf-fed Holsteins. We aimed to identify whether liver abscess occurrence and animal performance can be improved under the new limitations, targeting improved animal productivity and animal health for local feedlots. One newsletter article was released, and we plan to publish the results in a peer reviewed journal.

Outcomes and impacts: We found that Virginiamycin supplementation decreased liver abscess incidence while increasing average daily gain and feed efficiency by 8.6% and 7.6%,

respectively. This work showed that improvement in production is still possible within the new limitations set by regulatory agencies. We anticipate any feedlots having animal health concerns related to liver abscess to apply this information to effectively improve animal health and productivity.

Beef Quality Assurance (BQA) Assessments: The packing plant processing the majority of local Holstein steers initiated a requirement for feedlots to pass a BQA assessment before being allowed to continue sending cattle to their plant. Managers were given 30 days to have the assessment done. I aimed to ensure there were no negative economic impacts to the industry while helping feedlots become compliant.

Outcomes and impacts: In collaboration with the California Cattlemen's Association, I worked with all feedlots in the Imperial Valley and two feedlots in Kern County (in collaboration with Julie Finzel, UCCE) to ensure that all were BQA compliant at the time of the assessment. This meant individual meetings with all managers to ensure paperwork storage, standard operating procedures, and animal handling methods were BQA compliant. 100% of feedlots passed the assessment and were able to continue sending cattle to the plant without any delays.

Heat Stress in Livestock

In 2018 the Imperial Valley spent 220 days in severe, very severe, and animal death categories of the temperature-humidity index. Most of the 1-5% death loss occurs within the period of extreme heat. With 350,000 head of cattle in Imperial County, this could mean a loss of \$10,000,000. Research aimed to measure impacts of heat on breathing patterns, external body temperature, and rectal body temperature throughout multiple days for the summer period. We targeted improving animal health and resilience to extreme weather.

Outcomes and impacts: The study identified issues assessing cattle health in the extreme heat due to variety in animal response that was previously not well known for the geographic region. This indicated a need to better understand the impact of heat on Holstein steers and identification of methods to improve heat mitigation. Within the next year, a study on heat mitigating feed additives will be initiated observing the efficacy of the product on production and body heat mitigation. The use of rumen bolus thermometers will improve data collection in the expansion of the earlier work. Proving additive efficacy has potential to improve production, decreasing the cost per animal and cost of death loss due to heat stress. Additionally, I worked with Jim Oltjen and graduate students to design a similar study for Northern California. Two feedlots and the feedlot veterinarian expressed interest in further collaboration on heat stress related research.

Forage Production

Alternative feeds for livestock can decrease feed costs if production factors are appropriate for the growing region. Multiple growers have expressed desire to produce Moringa due to the nutrient density of all parts of the plant. We aimed to identify whether Moringa, a nutrient dense plant, can be produced in the hot, arid climate of the low desert.

Outcomes and impacts: We tested direct seeding of Moringa to fields for forage production, which was shown to be ineffective and inefficient for forage production. We will continue to identify methods to improve Moringa production in the future. There is a strong market for Moringa products with consumers becoming more health conscious, so effective production factors can improve the economic success of forage growers in the low desert.

Food Waste Diversion

This research aimed to identify methods to reduce the quantity of food waste required to be redirected away from landfills based on recent legislation. I worked with Yu Meng (UCCE) to design a method of quantifying fresh vegetable food in school food preparation areas. Research was done in collaboration with 4H, the Imperial Valley school food service collaborative, and two public schools.

Impacts and outcomes: We have identified two public schools willing to run a pilot study in collaboration with 4H students in order to quantify fresh food waste production. If we see viability in collecting this food waste, it has potential to decrease the cost of food waste disposal, mitigating some of the financial burden on schools while decreasing feed cost for livestock production, even if only on a small scale. If successful, there is potential to amplify the project to include other entities required to divert food waste.

Small Ruminants

Through individual meetings and collaboration with a local veterinarian, I have been able to meet and discuss needs for over 15 small ruminant owners throughout the three counties.

Outcomes and impacts: It was determined that workshops are desired to acquire new knowledge on small ruminant care and reproduction. Within the next year the livestock program will put together at least two workshops aimed at providing the needed information to small ruminant owners as well as continuing the needs assessment to pinpoint more specific needs. An extreme need for small ruminant veterinary care was identified in Imperial county, especially after changes to antimicrobial use regulations in California. Through collaboration with CDFR, Imperial County Farm Bureau, and local veterinarians, we have identified methods to attract potential veterinarians to fill the gap, which will ultimately improve the health of local small ruminants while promoting judicious use of antimicrobials throughout the county.

Theme #2: Food safety and environmental quality

Livestock interface with fresh produce

Recent E. coli O157:H7 outbreaks in romaine lettuce originating from the Yuma and Salinas growing regions have raised concerns over the safety of raising livestock, specifically feedlot cattle, near fresh produce fields. While there has been some research on food safety related to nearby feedlots, the research was not appropriate for the geographic region and livestock management methods of Southern California. Distrust and discord among farmers, commodity buyers, and the public demonstrated there are knowledge gaps within the US food system leading to changes in food safety regulations that are not based in science.

Discussions with livestock producers, produce growers, UCCE advisors, UCCE specialists, UC Davis faculty, University of Arizona specialists, and commodity groups were critical to understanding the needs regarding the livestock/fresh produce interface. Meetings with government entities such as CDFA and the FDA were also used to determine potential funding and collaboration for future research. Two workshops were held in Imperial County to further these discussions and identify research needs for both commodities. Attendees were able to discuss management practices of their commodity while learning more about other commodity management techniques.

Outcomes and impacts: Set back distances of fresh produce fields from concentrated animal feeding operations (CAFOs) based on pathogen movement from the livestock premises was the major research need identified. Rebecca Ozeran (UCCE) and I worked with local producers and commodity groups to establish UCCE as a reliable, unbiased contributor of information and able facilitator of difficult conversations. This led to three occasions of leafy greens commodity groups and two journalists reaching out for more information on livestock management in California to better understand the system. This work is still ongoing, though future articles, outreach, and research will increase the knowledge of producers and commodity buyers regarding the interface between livestock and fresh produce. Ultimately, the research and outreach will improve food safety and public trust of food safety in the US through identification of safe set back distances.

University & Public Service

I participated in two presentations and a written statement aimed at county officials highlighting the positive impacts UCANR provides to the counties I serve, specifically related to the livestock program. In another effort to contribute to the positive impact of UCANR, I provided feedback related to livestock and the southern desert areas of California at monthly meetings of the Sustainable Food Systems panel. I served on two interview panels for two county-based employees. I served on the search committee for the feedlot management specialist position to be housed at the Desert Research and Extension Center, providing input on candidates and implementing the southern California visit of the interview process. I joined the Desert Research and Extension Center Research Advisory Committee, giving feedback on potential research projects to be implemented at the research center.

Public service was an important part of my program, with the goal of enhancing the visibility of UCANR in the community while supporting youth education aimed at agriculture and animal science. This included visits to six local high school classrooms and a high school ag summit, reaching over 400 students, to communicate what UCCE does in the community and what I do as a livestock advisor. I used my knowledge of animal science to aid and judge 4H and FFA student animal science submissions in conferences, interviews, skillathons, and county fairs.

I plan to continue my efforts to serve on a university and public level. I will remain active on the committees I currently serve as well as find new ways to contribute to UCANR and the public.

Professional Competence

Increasing my knowledge of the environment, livestock management, and the UCANR system was critical to molding my program to be as productive and effective as it could be. This meant diving into meeting clientele, county officials, other advisors, specialists, county directors, and UC professors to find potential collaborators. This included the livestock program team meetings, desert workgroup meeting, and dairy program team meetings. These meetings were important in identifying collaborators and directly led to collaboration on past and ongoing projects. To better learn the UCANR system and resources offered, I attended 12 online trainings as well as the programmatic orientation, statewide conference, and regional information sessions. In order to learn more about clientele and industry needs, I attended relevant animal science, California Cattlemen's Associations, and CCA Feeder council conferences. I was invited to present three times to groups outside my clientele, including a poster presentation at the American Society of Animal Science, of which I am a member.

In the future I plan to continue to improve my professional competence through regular trainings offered through UCANR and outside groups. Maintaining an understanding of clientele needs, industry needs, and networking with potential collaborators will be critical to supporting an effective program.

Affirmative Action

I committed myself to identifying underrepresented groups that would benefit from the livestock program at the onset of my program. I learned how to report and identify these underrepresented groups and how to contact those individuals to notify them of resources the livestock program offers. I accomplished this through trainings led by ANR as well as outside sources. I specifically applied all reasonable efforts for all livestock program events including posting to social media, newsletters, and making personal contact with several groups and individuals in the underserved communities. In the future I will continue to make efforts to identify underserved groups and create methods to ensure those groups have knowledge of and opportunity to attend livestock program activities. I will identify alternative techniques, such as partnering with local veterinarian and livestock groups, to identify potential clientele. Providing equitable service to all clientele in my counties is of paramount importance.

Closing Summary

The initial two years of the livestock program for the desert area of California were largely focused on learning about the livestock systems of Southern California, meeting clientele and potential collaborators, and understanding the needs of my clientele. I was able to broaden the recognition of UCCE and UCANR through my regular interactions with clientele and the community. I am now recognized as a resource to help improve agriculture in Imperial, Riverside, and San Bernardino Counties. The applied research performed during my first two years has given me information to continue the livestock program in a productive direction that will best improve animal productivity, food safety, and resilience in a changing climate in California. Within the next reporting time period I plan to further develop relationships and trust with clientele, continue to extend information needed by clientele, broaden the impact of my program, and work obtain funding for further programmatic research and outreach.

IV. Supporting Documentation

A. Project Summary

Project Title	Role	Collaborators	Support Amount/Duration (if applicable)	Support Source
Productivity, efficiency, and sustainability of animal agriculture				
Heat Adaptation in Feedlot Calf-fed Holsteins	PI	Richard Zinn @ UC Davis Martin Montano, Universidad Autonoma de Baja California		
Food waste diversion through livestock	Co-PI	Yu Meng @ UC ANR; Kristian Salgado @ UC ANR		
Virginiamycin and implant strategy impact on calf-fed Holstein productivity	Co-PI	Richard Zinn @ UC Davis Martin Montano, Universidad Autonoma de Baja California		
Effect of pen-space on calf-fed Holstein steers	Co-PI	Richard Zinn @ UC Davis Martin Montano, Universidad Autonoma de Baja California		
Calcium supplementation requirements for calf-fed Holstein steers	Co-PI	Richard Zinn @ UC Davis Martin Montano, Universidad Autonoma de Baja California		
Metabolizable methionine and lysine requirements for calf-fed Holstein steers	Co-PI	Richard Zinn @ UC Davis Martin Montano, Universidad Autonoma de Baja California		
Effect of hydrolyzed yeast cell supplementation on	Co-PI	Richard Zinn @ UC Davis Martin Montano,		

Project Title	Role	Collaborators	Support Amount/Duration (if applicable)	Support Source
productivity of calf-fed Holstein steers		Universidad Autonoma de Baja California Martin Montano, Universidad Autonoma de Baja California		
Effect of supplementing cinnamaldehyde-eugenol and capsicum on productivity of calf-fed Holstein steers	Co-PI	Richard Zinn @ UC Davis Martin Montano, Universidad Autonoma de Baja California		
Effect of supplemental protected amino acids on productivity of calf-fed Holstein steers	Co-PI	Richard Zinn @ UC Davis Martin Montano, Universidad Autonoma de Baja California		
Forage production in the low desert including Moringa as a novel forage crop	Co-PI	Oli Bachie @ UC ANR		
Food safety and environmental quality				
Livestock/produce interface and food safety	Co-PI	Rebecca Ozeran @ UC ANR, Paula Rivendeneira @ University of Arizona		

B. Professional Competence and Professional Activity

Professional Development and Training

Begin Date - End Date	Location	Name, Description and Occurrence of Activity
Oct 4, 2017	Holtville, CA	Office On-boarding Safety Training

Begin Date - End Date	Location	Name, Description and Occurrence of Activity
Oct 5, 2017	Online	UC Sexual Violence and Sexual Harassment Prevention Training for Supervisors and Faculty
Oct 17, 2017 - Oct 19, 2017	Davis, CA	UC ANR Programmatic Orientation
Oct 26, 2017	El Centro, CA	Tour of IID Headquarters and Background of Water Use in Imperial County
Nov 13, 2017	Online	Procurement Card Training
Nov 14, 2017	Online	Procurement Card Webinar
Nov 21, 2017	Imperial, CA	Tour Imperial Dam, Irrigation, and Drainage System with Imperial Irrigation District
Nov 29, 2017	Sparks, NV	Beef Workgroup Meeting
Nov 29, 2017 - Nov 30, 2017	Sparks, NV	California Cattleman's Association Annual Convention
Jan 24, 2018	Online	Animal Care and Use 101 Training
Feb 21, 2018	San Bernardino, CA	Met with Janet Hartin (UCCE San Bernardino county director) to discuss program and opportunities
Feb 21, 2018	Riverside, CA	Met with Eta Takele (UCCE Riverside county director) to discuss program and opportunities
Feb 23, 2018	Online	UC Compliance and Conflict of Interest for Researchers Training
Mar 22, 2018	Online	Systems Thinking Symposium
Apr 9, 2018 - Apr 12, 2018	Ontario, CA	Statewide ANR Conference
Apr 11, 2018	Ontario, CA	Desert Workgroup meeting

Begin Date - End Date	Location	Name, Description and Occurrence of Activity
May 23, 2018 - May 25, 2018	San Diego, CA	CCA Feeder Meeting
May 31, 2018	Chino, CA	Mentor meeting and tour through the Chino area with UCCE Specialist Deanne Meyer
Aug 13, 2018	Online	Annual Evaluation training
Aug 20, 2018	Chino, CA	Dairy farm safety seminar
Sep 12, 2018 - Sep 14, 2018	Davis, CA	California Net Energy Symposium
Sep 18, 2018 - Sep 20, 2018	Davis, CA	Meat Production and Food Safety Workgroup bus tour
Apr 9, 2019 - Apr 10, 2019	Hanford, CA	Dairy program team meeting
May 8, 2019	Davis, CA	STEAD training
May 22, 2019 - May 24, 2019	San Diego, CA	California Cattlemen's Association Feeders Meetings
Jul 11, 2019	Online	Cybersecurity safety training
Aug 19, 2019	Online	Sexual Harassment Training
Aug 20, 2019	Online	P-card training
Aug 23, 2019	San Diego, CA	Regional Information Session

Disciplinary Society or Professional Association

Disciplinary Society/Prof. Assoc Name	Membership/Meetings Attended/Activities
American Society of Animal Science	Member 2018-present

Evidence of Professional Competency

Begin Date - End Date	Location	Name, Description and Occurrence of Award, Recognition, Professional Presentation, Office or Activity
Feb 22, 2018	Bakersfield, CA	Presented Desert Livestock Update at Kern County UCCE Livestock Symposium
Jul 9, 2018 - Jul 12, 2018	Vancouver, BC, Canada	Presented poster on heat stress in feedlot cattle at annual American Society of Animal Science conference
Mar 26, 2019	Davis, CA	Taped segment for Ranch Water Quality Planning video project

C. University Service

Begin Date - End Date	Name, Description, and Occurrence of Activity	Org Level	Your Contribution and Leadership Role
May 2, 2018	Presented UCCE projects and impacts to Imperial County Board of Supervisors and CEO	County	Presented role and impacts of Imperial Livestock program to explain importance of UCCE to the county
Oct 10, 2018	Serve on interview panel for SRA at Imperial County office	County	Provided input on interviewees for county SRA position
Nov 1, 2018 (Ongoing)	Sustainable Food Systems panel member	Division-wide	Panel member – contribute thoughts to unify, communicate, and advocate for UCANR and the SI specifically related to the southern, desert regions of California and livestock
Jan 23, 2019 - Dec 18, 2019	Search Committee meeting for UCANR Feedlot specialist position	Division-wide	Committee member – contribute feedback on candidates to select for the feedlot specialist and help coordinate/implement El Centro portion of candidate visit to be stationed at UC DREC

Begin Date - End Date	Name, Description, and Occurrence of Activity	Org Level	Your Contribution and Leadership Role
Feb 11, 2019	Serve on interview panel for Climate Smart CES position	County	Provided input on interviewees for county Climate Smart CES position
Apr 26, 2019 (Ongoing)	Serve on UC ANR Desert Research & Extension Research Advisory Committee	Division-wide	RAC committee member – contribute feedback on potential research trials to be done at UC DREC
Nov 14, 2019 (Ongoing)	Safety coordinator for Imperial county office	County	Safety coordinator – present monthly safety updates and trainings, ensure safety practices in the office, and communicate with UCANR safety program leads

D. Public Service

Begin Date - End Date	Name, Description, and Occurrence of Activity	Org Level	Your Contribution and Leadership Role
Oct 25, 2017	Present About Career in UC Cooperative Extension to Animal Science and Agriculture Classes Through IVROP at Imperial High School	Community	Presenter
Feb 9, 2018	Present UCCE career information to highschool animal science students at Southwest High School	Community	Presenter
Feb 18, 2018	Boys and Girls Club of Imperial Valley Produce Gala and Saladero Contest Benefit	Community	Represent UCANR/UCCE in prepping salad with local ingredients and promoting the livestock program with a large cut out Holstein
Mar 15, 2018	Represented UCCE Imperial at Youth Ag Summit. Explained role of UCCE in the community	County	Presenter

Begin Date - End Date	Name, Description, and Occurrence of Activity	Org Level	Your Contribution and Leadership Role
Oct 30, 2018	4H skillathon preparation	County	Provide information and help 4H students prepare for national animal science skillathon
Mar 9, 2019	Aid in Imperial County fair livestock auction	County	Aid in livestock auction as needed.
Mar 11, 2019	Serve as panelist for Interview Panel for Imperial Valley Regional Occupational Program for agricultural program awards	County	Interview panelist – contribute feedback on student interviews regarding students wishing to continue into an agriculture related career
Apr 27, 2019	California FFA Agriscience Fair	State	Judge and provide feedback on livestock related papers and posters

E. Extension Activities

Meetings Organized

Begin Date - End Date	Meeting Name and Type	Topic/no. of repetitions	Role	Location(s)	Total No. of Attendees
Productivity, efficiency, and sustainability of animal agriculture					
Feb 28, 2018	Desert Ag Symposium	Desert Livestock Update / 1	Organized Livestock section of symposium. Promoted and invited audience and speakers.	Palm Desert, CA	12
Mar 7, 2019	Field tour of local Imperial county cattle	Local cattle industry examples / 1	Organized tours and set agenda	Imperial County feedlots	5

Begin Date - End Date	Meeting Name and Type	Topic/no. of repetitions	Role	Location(s)	Total No. of Attendees
	industry for outside companies				
Food safety and environmental quality					
Apr 22, 2019	Livestock Food Safety Workshop	Discussions by presenters on the existence and perpetuation of pathogens and the interaction between livestock and produce. / 1	Organized speakers, topics, lunch, and agenda. Promoted and invited audience and speakers. Collaborated with Gaby Meier (Beef Vet Specialist, UC Davis) and Rob Atwill (Director, Vet Med Extension, UC Davis)	DREC	25
Jun 11, 2019	Good Ag Neighbors	Conversations about the interaction between livestock and produce. How farmers can work together across different commodities. / 1	Area organizer, help for main organizers with set up, outreach and invites, resources, and other needs.	DREC	50

Educational Presentations

Begin Date - End Date	Meeting Name/Event	Presentation Topic/no. of repetitions	Location(s)	No. of Attendees
Productivity, efficiency, and sustainability of animal agriculture				

Begin Date - End Date	Meeting Name/Event	Presentation Topic/no. of repetitions	Location(s)	No. of Attendees
Oct 4, 2017	Imperial County Farm Bureau Meeting	Introduction of self and background as well as goals for my program / 1	El Centro, CA	28
Jan 17, 2018	Imperial County Fairboard Meeting	Introduction of self and background. Offered to aid livestock portion of fair in any way possible. / 1	Imperial, CA	13
Feb 7, 2019	Present on Alternative Manure Management CDFA climate smart program	AMMP opportunities and process for Imperial County ranchers / 1	El Centro, CA	7
Sep 17, 2019	San Bernardino Farm Bureau Meeting	Livestock program in San Bernardino county / 1	San Bernardino, CA	12
May 22, 2019	Imperial County School Food Service Cooperative meeting	Preliminary study on food waste and livestock food waste use / 1	Imperial County	0

Other (including websites, social media, blogs, collaborations with other agencies, organizations, policy engagement)

Begin Date - End Date	Description	No. of Instances
Productivity, efficiency, and sustainability of animal agriculture		
Dec 1, 2018 - Jan 31, 2019	Beef Quality Assurance Assessments	9
Jan 1, 2019 - Dec 31, 2019	CDFA Climate Smart Alternative Manure Management Program technical support provider	1

Other (including TV and/or radio interviews/programs, newspaper/trade magazine interviews)

Begin Date - End Date	Interviewed/Written By (optional)	Topic	Name of Media or Publication
Productivity, efficiency, and sustainability of animal agriculture			
Sep 27, 2019	Brian German	The importance of clientele attending meetings	Participating in Agricultural Meetings Creates Long-Term Benefits
Food safety and environmental quality			
Apr 10, 2019	Jesse Staniforth	Safety of agricultural water relative to produce safety	Agricultural Water Safety

F. Publications (Bibliography)

Peer Reviewed	
B - Peer-reviewed scholarly journal publications	2

Non-Peer Reviewed	
A - Popular press articles	19
E - Published abstracts	1

TOTAL	22
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PEER REVIEWED

B - Peer-reviewed scholarly journal publications

- Capelari, M; Johnson, KA; **Latack, B**; Roth, J; Powers, W (2018). The effect of encapsulated nitrate and monensin on ruminal fermentation using a semi-continuous culture system. *Journal of Animal Science*. 96:8, 3446-3459.
- Montano, M.F.; Chirino, J.O; **Latack, B.C.**; Salinas-Chavira, J.; Zinn, R.A. (2019). Influence of supplementation of growing diets enriched with rumen-protected methionine and lysine on feedlot performance and characteristics of digestion in Holstein steer calves. *Applied Animal Science*. 35:3, 318-324.

NON-PEER REVIEWED

A - Popular press articles

- **Latack, B.** (2017). New livestock advisor - Brooke Latack. *Ag Briefs - Imperial County*. 2. 10/16/17. http://ceimperial.ucanr.edu/newsletters/Ag_Briefs71611.pdf
- **Latack, B.** (2017). Greetings from new livestock advisor. *Ag Briefs - Imperial County*. 8-9. 11/16/17. http://ceimperial.ucanr.edu/newsletters/Ag_Briefs72225.pdf

- **Latack, B.;** Bachie, O. (2018). Moringa to be tested for livestock feed potential. *California Dairy*. 27:11, 10-12. November. <https://indd.adobe.com/view/103048b1-4199-470f-95f6-c9901a31518b>
- **Latack, B.** (2018). Understanding the impact of animal agriculture on green house gas emissions. *Ag Briefs - Imperial County*. 21:2, 19-20. 2/15/18. http://ceimperial.ucanr.edu/newsletters/Ag_Briefs73530.pdf
- **Latack, B.** (2018). Desert livestock research update. *Ag Briefs - Imperial County*. 21:4, 67-69. 4/9/18. http://ceimperial.ucanr.edu/newsletters/Ag_Briefs74530.pdf
- **Latack, B.** (2018). Increased incidence of animal activism on California farms. *Ag Briefs - Imperial County*. 21:6, 93. 6/5/18. http://ceimperial.ucanr.edu/newsletters/Ag_Briefs75375.pdf
- **Latack, B.** (2018). Respiration rate of Holstein steers during high ambient temperatures. *Ag Briefs - Imperial County*. 21:8, 125-127. 8/30/18. http://ceimperial.ucanr.edu/newsletters/Ag_Briefs76464.pdf
- **Latack, B.** (2018). Moringa to be tested for livestock feed potential with other forage crops. *Ag Briefs - Imperial County*. 21:10, 161-163. 11/8/18. http://ceimperial.ucanr.edu/newsletters/Ag_Briefs77284.pdf
- **Latack, B.** (2018). Effect of pen space on calf-fed Holstein steers. *Imperial County Livestock Research Brief*. 1-3. 12/17/2018.
- **Latack, B.** (2019). A meeting you don't want to miss. *California Dairy Newsletter*. 11:3, 4.
- **Latack, B.** (2019). Effect of implant strategy on calf-fed Holstein steers. *Imperial County Livestock Research Brief*. 1-3. 1/7/19.
- **Latack, B.** (2019). Effect of delayed implants on calf-fed Holstein steers. *Imperial County Livestock Research Brief*. 1-8. 2/12/19.
- **Latack, B.** (2019). Effect of tannin supplementation on calf-fed Holsteins. *Imperial County Livestock Research Brief*. 1-3. 3/12/19.
- **Latack, B.** (2019). Effect of supplemental Kaolinite clay on calf-fed Holstein steers. *Imperial County Livestock Research Brief*. 1-4. 4/9/19.
- **Latack, B.** (2019). Effect of supplemental vitamin E on growth performance of feedlot Holstein steers. *Imperial County Livestock Research Brief*. 1-4. 5/14/19.
- **Latack, B.** (2019). Effect of non-structural carbohydrate concentrations on performance and carcass characteristics of feedlot Holsteins. *Imperial County Livestock Research Brief*. 1-3. 6/12/19.
- **Latack, B.** (2019). Effect of supplemental methionine and lysine on growth performance of feedlot Holstein steers. *Imperial County Livestock Research Brief*. 1-3. 7/9/19.
- **Latack, B.** (2019). Effect of high oil algae biomass supplementation during high ambient temperatures on growth performance of calf-fed Holstein steers in the feedlot. *Imperial County Livestock Research Brief*. 1-3. 8/13/19.
- **Latack, B.** (2019). Dried, shredded sugarbeets as a partial replacement for steam flaked corn in growing-finishing diets for calf-fed Holstein steers. *Imperial County Livestock Research Brief*. 1-3. 9/10/19.

E - Published abstracts

- Latack, B; Zinn, RA (2018). Respiration rate of calf-fed Holstein steers exposed to high ambient temperature during the late finishing phase. *Journal of Animal Science, suppl.* 96, 17-18.